

Argonne National Laboratory Learning Lab – Power Up!
NGSS Standards
Middle School (5th – 8th Grade)

Science Principles
<ul style="list-style-type: none"> • All human activity has short and long-term consequences. • New technologies can have unintended results. • Energy is not created or destroyed.

Elementary and Middle School Performance Expectations
<p>5-PS3-1: Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.</p> <p>MS-ETS1-1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.</p> <p>MS-PS3-5: Construct, use and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.</p>

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p><u>5-Developing and Using Models:</u> Use models to describe phenomena.</p>	<p><u>5-Energy in Chemical Processes and Everyday Life:</u> The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water).</p>	<p><u>5-Energy and Matter</u> Energy can be transferred in various ways and between objects.</p>
<p><u>MS-Developing and Using Models:</u> Develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs.</p> <p><u>MS-Planning and Carrying Out Investigations:</u> Use multiple variables and provide evidence to support solutions or explanations.</p>	<p><u>MS-Developing Possible Solutions:</u> Models of all kinds are important for testing solutions.</p> <p><u>MS-Conservation of Energy and Energy Transfer:</u> When the motion energy of an object changes, there is inevitably some other change in energy at the same time.</p>	<p><u>MS-Influence of Science, Engineering, and Technology on Society and the Natural World:</u> All human activity draws on natural resources and has both short-and long-term consequences.</p> <p><u>MS- Energy and Matter</u> Energy takes different forms. Energy transfer can be tracked through a system.</p>